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Notes on *Ptychobela* and *Brachytoma*, with the description of a new species from Mozambique (Mollusca: Gastropoda: Turridae)

by

R. N. Kilburn
(Natal Museum, Pietermaritzburg)

ABSTRACT

The type species of *Brachytoma* Swainson, 1840, *Pleurotoma strombiformis* Sowerby, 1839 [= *P. stromboides* Sowerby, 1832] is considered a *nomen dubium*, its purported type specimen being of unknown origin and status. The genus *Brachytoma* and the subfamily Brachytominae Thiele, 1929, must thus be rejected as of doubtful application.

The genus *Ptychobela* Thiele, 1925, is referred to the Crassispirinae on radula characters. The earliest available name for its type species, *Pleurotoma* [= *Clavatula*] *crenularis* Lamarck, 1816 (o.d.), is *Murex nodulosus* Gmelin, 1791, for which a neotype is designated. *Pleurotoma crenularis* Kiener, 1840 (*non* Lamarck, 1816) and *Brachytoma vexillium* Habe & Kosuge, 1966*a* (= *B. vexillum* Habe & Kosuge, 1966*b*) are synonyms of *Drillia suturalis* Gray, 1838. *Pleurotoma sumatrensis* Petit de la Saussaye, 1852, is shown to be a valid species, and a lectotype is designated and described. *Ptychobela opisthochetos* sp. n. from Mozambique is described.

Types figured: *Drillia suturalis* Gray, 1838, *C. griffithii* Gray in Griffith & Pidgeon, 1834 (holotypes); *Pleurotoma sumatrensis* (lectotype); *Murex nodulosus* (neotype).

INTRODUCTION

Investigation of the affinities of an apparently new species of the genus *Ptychobela* Thiele, 1925, revealed a tangled chain of nomenclatural problems, resulting from the questionable identity of the potentially senior synonym *Brachytoma* Swainson, 1840, and of the type species of the two taxa.

The name *Ptychobela* was proposed for a group of relatively large Indo-Pacific Turridae, of which *Pleurotoma crenularis* Lamarck, 1816, was cited as type species. Thiele subsequently (1929: 362) synonymised *Ptychobela* with the genus *Brachytoma* and introduced the subfamily name Brachytominae to include this (together with various other genera which are now referred to the subfamilies Borsoniinae and Mangeliinae). However, Powell (1966: 89) retained the two genera as distinct and instead treated *Ptychobela* as a synonym of *Inquisitor* Hedley, 1918. Shuto (1969: 195) regarded *Ptychobela* as a subgenus of *Inquisitor* lacking 'the massive subsutural band'. As has already been stated (Kilburn 1988: 258) there exist major differences in radula form between *Ptychobela* and *Inquisitor*; these are further discussed below.

Genus *Brachytoma* Swainson, 1840

Brachytoma Swainson, 1840: 154, 314. Type species (s.d. Herrmannsen, 1846) *Pleurotoma strombiformis* Sowerby, 1839 [= *P. stromboides* Sowerby, 1832].

The type species of this genus was founded on an ambivalent figure accompanied by neither description nor type locality. Subsequently, Reeve (1843: pl. 9, sp. 71) claimed that *P. stromboides* inhabited the Bay of Panama, on the basis of material dredged by *H.M.S. Sulphur.* Two opposing opinions on the status of the name have been expressed, almost simultaneously, by writers on the molluscs of tropical West America. In the standard work on the region, McLean (in Keen 1971) excluded the name from the turrid fauna, citing *stromboides* Reeve, 1843, *non* Sowerby, 1832, as a synonym of *Strombinoturris crockeri* Hertlein & Strong, 1951. In contrast, Olsson (1971: 48), after examining the supposed type specimen of *stromboides* in the BM(NH), regarded this as a prior name for *crockeri*, and accordingly accepted the names *Brachytoma* and Brachytominae as valid. However the purported type specimen (BM(NH) 196991), to which Olsson and Powell (1966) refer, proves to have no known history (pers. comm. Ms K. Way), so that there are in fact no valid grounds for conferring type status upon it. As none of the names in question is in general use and some doubt is attached to their interpretation, there is little merit in designating a neotype. The specific name *Pleurotoma stromboides*, the generic name *Brachytoma*, and the subfamilial name Brachytominae should all, in my opinion, be rejected as *nomina dubia*.

The question of the relationship between *Strombinoturris* Hertlein & Strong, 1951, and *Ptychobela* will be discussed below, as will the identity of *Pleurotoma sumatrensis* Petit, 1852, erroneously cited by Olsson as a synonym of *Brachytoma stromboides*.

Genus *Ptychobela* Thiele, 1925

Ptychobela Thiele, 1925: 181 (215). Type species (o.d.) *Clavatula crenularis* Lamarck, 1816 [= *Murex nodulosus* Gmelin, 1791].

The identity of the type species of this genus requires clarification. The original figure (pl. 440, figs 3*a*, *b*) of *Clavatula crenularis* was very badly drawn, as was noted by Lamarck himself (1822: 92), and the subsequently published description very brief. Kiener (1840: 31, pl. 19, fig. 2) fully described and accurately figured a shell from 'Coll. Mass[éna ex] Lam.', which is still preserved in the MHNG collection (pers. comm. Dr C. Vaucher). This specimen (Figs 7–8) is an example of the species which in the interim had been described as *Drillia suturalis* Gray, 1838. However, although agreeing in length with the measurement given by Lamarck ['15 lignes et demie' = *ca* 35 mm], its coloration does not accord with that described for *crenularis* ['inferne griseis, superne rufo-violaceis'] and it cannot be regarded as an authentic type. Dr Y. Finet informs me that this is the only specimen in the Delessert collection whose measurements agree, and that it is now impossible to determine whether the other syntype—an annotation left by Rosalie de Lamarck indicates that her father's collection contained two specimens—is still extant. According to photographs (courtesy Mr G. Dajoz) specimens labelled as *crenularis* in the Delessert collection are a mixture of *suturalis*, *crenularis auctt.* and *griffithii* (Gray, 1834).

In the absence of authentic Lamarckian material, one is forced to rely on his meagre colour description for the identification of *crenularis*. This description in fact applies very well to the *crenularis* of Reeve (1843: pl. 7. fig. 54) and most subsequent authors. (Evidently confused by the composite series in the Delessert collection, Deshayes (1843: 347) uncritically accepted the figures of both Kiener and Reeve as representing Lamarck's species.) Weinkauff (1875: 47, pl. 10, fig. 6) appears to have figured and described *Inquisitor* [or *Funa*] *variabilis* (E. A. Smith, 1878) under the name *crenularis*. However, the earliest representation (albeit a rather crude one) of *crenularis* was given by the non-binomial writer Chemnitz (1780: pl. 159, figs 1505, 1506) who called it 'Die geflugelte Schraubenschnecke mit wellenformigen knoten' (Figs 1–2). On these figures Gmelin (1791) bestowed the binomial *Murex nodulosus*, which in fact is the earliest name available for this common Indian species.

Thiele's illustration (1931: pl. 34, fig. 31) of the radula of *Ptychobela crenularis* was correctly if sketchily drawn, presumably from an unstained preparation. More detailed camera lucida drawings of the radula of a specimen of *P. suturalis* from Western Australia (Fig. 17) and of *P. nodulosa* from Bombay (Figs 18–19), both donated by the late Virginia Maes, are here offered. Preparations were stained with Shirlastain A, and corroborated as far as possible against SEM photographs (quality too poor for reproduction) kindly provided by Mrs Maes. Each tooth is awl-shaped, without cutting edges or barbs, with a long internal limb that serves as a strut, its edge being fused in a complex manner to the interior of the folded-over tooth; the basement membrane is very flimsy. Curiously, a very different type of radula tooth (with conspicuous barb) was illustrated by Thorson (1940: fig. 22H) for '*Drillia crenularis* var. *griffithii* Gray' from the Persian Gulf, and by Powell (1966: Fig. D104) for '*Inquisitor* cf *crenularis*' from Japan. Presumably yet another genus in this complex remains to be differentiated from *Ptychobela*, *Inquisitor* and *Funa* Kilburn, 1988. To summarise the essential differences between the three genera, in *Ptychobela* the marginal plates are awl-shaped with a sharp tip that lacks cutting edges, in *Inquisitor* the plates have a short shaft with a single relatively long cutting edge, while in *Funa* they have a long shaft with a double cutting edge.

On the basis of Thiele's figure, I previously (1988: 258) referred *Ptychobela* to the subfamily Borsoniinae, but the presence of an accessory limb would seem to demonstrate crassispirine affinities, despite the overall borsoniine appearance of the radula. Although there is some superficial resemblance between *Ptychobela* and the west American *Strombinoturris* Hertlein & Strong, 1951, radula characters distinguish the two, the latter genus being a true member of the Borsoniinae, with slender, hollow, harpoon-like marginal teeth, bearing a tiny terminal barb (Olsson 1971: 48, Fig. 91). Another important character at the generic-level appears to be the presence of microshagreen sculpture over much of the shell of *Strombinoturris*, but not in *Ptychobela*.

Ptychobela nodulosa (Gmelin, 1791)
(Figs 1–4)

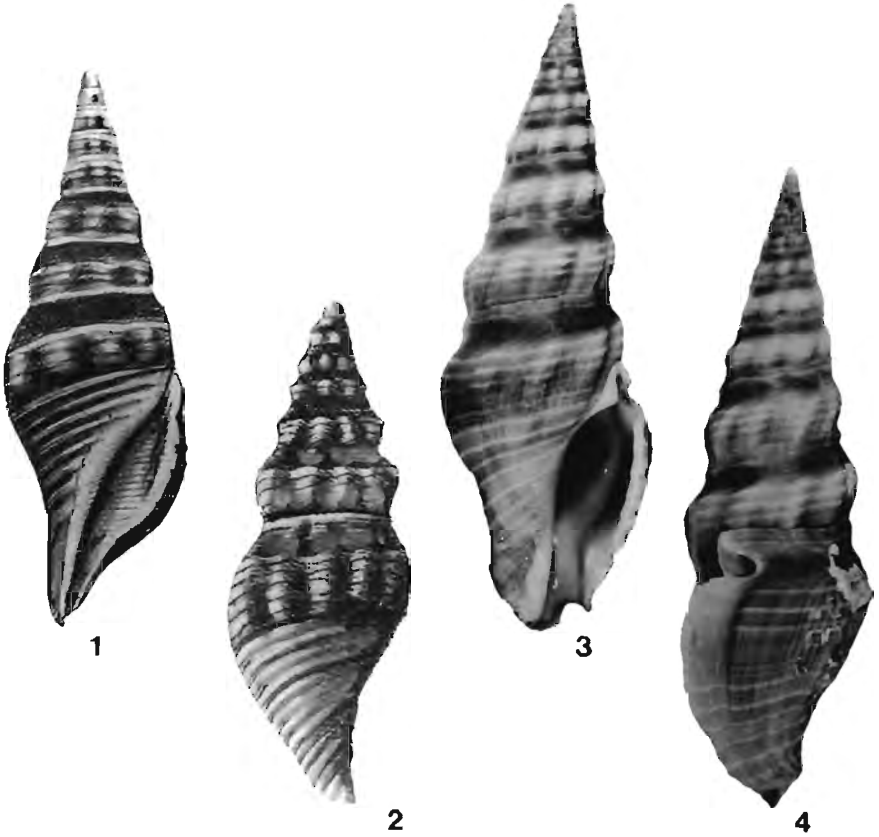
Murex nodulosus Gmelin, 1791: 3562 (based on Chemnitz, 1780: pl. 159, figs 1505, 1506). Type locality unknown [= Tranquebar, India, *fide* Chemnitz].

Clavatula crenularis Lamarck, 1816: 9, pl. 440, figs 3*a*, *b*. [*syn. n.*] Type locality unknown.

Pleurotoma crenularis Lamarck, 1822: 92; [*partim*] Deshayes, 1843: 347; Reeve, 1843: pl. 7, fig. 54; Powell, 1966: pl. 12, figs. 5, 6.

Brachytoma crenularis; Graveley, 1942: 75, 101; Satyamurti, 1952: 200, pl. 19, fig. 4.

Ptychobela crenularis; Thiele, 1925: 181 (215), pl. 34 (46), figs 29 (operculum), 31 (radula).

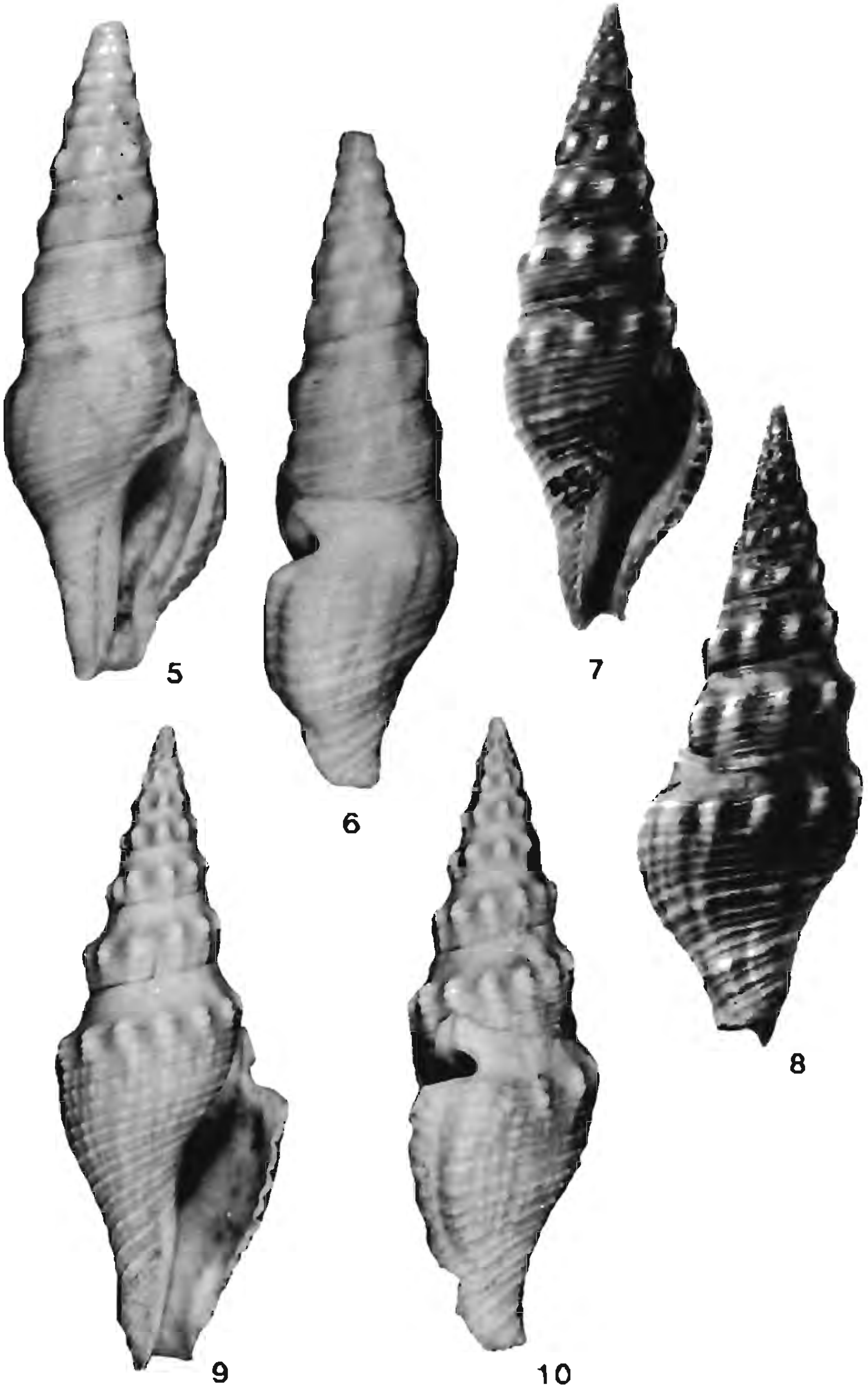


Figs 1–4. *Ptychobela nodulosa* (Gmelin, 1791). 1–2. Type figures of *Murex nodulosus* Gmelin, 1791, after Chemnitz (1780: pl. 159, figs 1505, 1506). 3–4, Neotype, ANSP 231901, Bombay Island, 42,5 × 14,3 mm.

The type material of this species was in the Chemnitz collection, and is now lost. As its identity is crucial to an understanding of the genus, I designate a neotype, ANSP 231901 (Figs 3–4). Data: Bombay Island, NW India, intertidal, E. Weidman, 1958; dimensions 42,5 × 14,3 mm.

P.nodulosa differs from *P. suturalis* (Gray, 1838) in its more rounded periphery (without a shoulder keel), shorter siphonal rostrum, regular and more numerous (2–6) interstitial spiral threads in all intervals (in *suturalis* each interval bears at most 1–2 threads) and in its characteristic colour pattern. This consists of a broad yellowish peripheral band, flanked on the shoulder slope by a dark reddish-brown zone, and below the periphery of the body whorl by a lighter brown one, base of body whorl tinged with greyish. *P. nodulosa* is a characteristic Indian species, ranging from Bombay to Madras (NM colln).

Pleurotoma (Drillia) baynhami E. A. Smith (1891: 404, pl. 33, fig. 2) from the Gulf of Aden and Arabian Sea may be an extreme form (or possibly a subspecies) of *P. nodulosa*, but its relationships with both this and with *P. suturalis* require further investigation. *Ptychobela insignita* (Melvill, 1923) (= *Brachytoma kurodai*



Figs 5–10. *Ptychobela suturalis* (Gray, 1838) and *P. griffithii* (Gray, 1834). 5–8. *P. suturalis*: 5–6. Holotype, BM(NH) 1875.4.26.21, 31,6 × 10,5 mm: 7–8. Specimen figured as *Pleurotoma crenularis* (*non* Lamarck, 1816) by Kiener (1840). MNHG 1097/53; 35,5 × 12,3 mm (photograph courtesy G. Dajoz). 9–10. *P. griffithii*: Holotype, BM 1875.4.26.22, 39,5 × 14,1 mm.

Habe & Kosuge, 1966) from the Philippines and Taiwan is somewhat similar to *nodulosa* but has more numerous and conspicuous axial ribs, which extend well onto the base of the body whorl.

Ptychobela suturalis (Gray, 1838)
(Figs 5–8)

Drillia suturalis Gray, 1838: 29. Type locality unknown.

Pleurotoma crenularis (*non* Lamarck, 1816); Kiener, 1840: 31, pl. 19, fig. 2; [*partim*] Deshayes, 1843: 347.

Brachytoma vexillium [sic] Habe & Kosuge, 1966*a* (January): pl. 38, fig. 15. [**syn. n.**] Type locality not given [= Anpin, Formosa, fide Habe & Kosuge, 1966*b*].

Brachytoma vexillum Habe & Kosuge, 1966*b* (May): 336, pl. 29, fig. 5. [**syn. n.**] Type locality: Anpin, Formosa [= Taiwan].

Ptychobela vexillum; Springsteen & Leobrera, 1986: 279, pl. 80, fig. 2.

The holotype of *Drillia suturalis* (BM(NH) 1875.4.26.21) is a worn, faded specimen, dimensions 31,6 × 10,5 mm; it is here illustrated (Figs 5–6), apparently for the first time. It should be noted that the name is not a homonym of *Pleurotoma suturalis* Bronn, 1831, *P. suturalis* Cristofori & Jan, 1832, or *P. suturalis* Andrzejovski, 1833. The holotype and two paratypes of *Brachytoma vexillium* are housed in the NSMT (Habe & Kosuge, 1966*b*); I have examined virtually topotypic material from Taiwan.

Ptychobela suturalis is a central West Pacific species, ranging from Taiwan and Singapore to Queensland and Western Australia. Specimens from Taiwan, Philippines and Singapore (*vexillium*) are dark in colour, with rather rounded node-like peripheral ribs, whereas Australian examples more closely resemble the holotype in their pale colour and weaker ribs, the shoulder keel being somewhat more conspicuous.

Clavatula griffithii Gray in Griffith & Pidgeon (1834: 596, pl. 37, fig. 6) is a somewhat similar Indian species which lacks a subsutural cord and has a wider aperture; holotype (Figs 9–10) BM(NH) 1875.4.26.22, dimensions 39,5 × 14,1 mm, locality unknown.

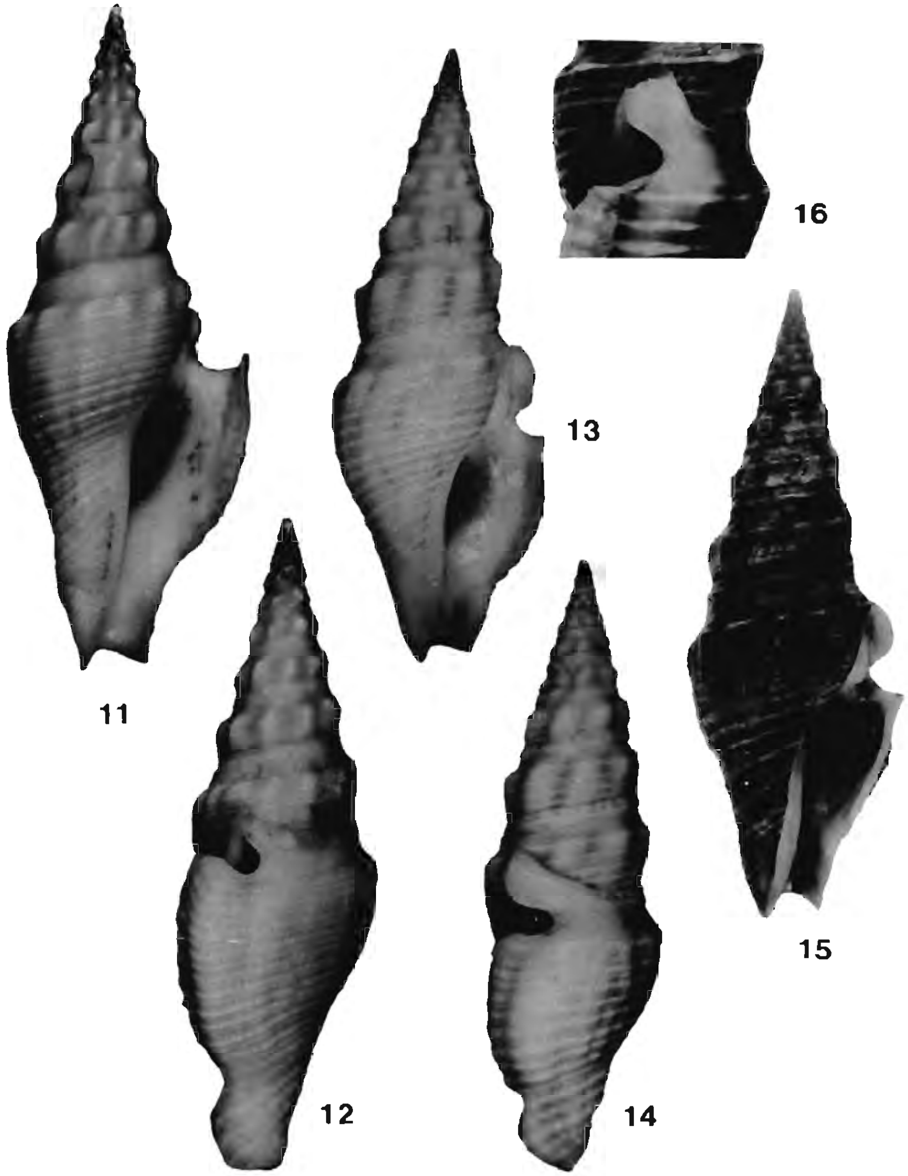
Ptychobela sumatrensis (Petit de la Saussaye, 1852)
(Figs 11–12)

Pleurotoma sumatrensis Petit de la Saussaye, 1852: 55, pl. 2, fig. 2. Type locality: off Sumatra.

Brachytoma sumatrensis; Powell, 1966: 89.

Type material: A syntype [= lectotype, here designated] is preserved in MHNP (Figs 11–12); it was collected by M. Martin and was originally in the Journal de Conchyliologie collection; dimensions 23,4 × 8,7 mm, live-taken (operculum dried deep inside aperture).

Powell (1966) drew attention to the confusion that exists between *P. sumatrensis* and *P. stromboides*, and concluded that the latter differs in its relatively stronger axial and weaker spiral sculpture. More recently, Olsson (1971: 48) synonymised *sumatrensis* with *stromboides* (utilising the latter name for the west American *Strombinoturris crockeri*), and queried the given type locality of Sumatra. *P. stromboides* is here rejected as a *nomen dubium* (see above), while *sumatrensis* proves to differ from *S. crockeri* in a host of characters, notably in its conspicuously alate lip, its lack of microshagreen sculpture and its possession of rather fine, dense spiral lirae overall. Although confirmation from radula characters is desirable, *sumatrensis* appears to be an undoubted *Ptychobela*.



Figs 11–16. *Ptychobela sumatrensis* (Petit de la Saussaye, 1852) and *P. opisthochetos* sp. n. 11–12. *Pleurotoma sumatrensis*, holotype, MNHP colln, 23,4 × 8,7 mm. 13–16. *P. opisthochetos*: 13–14. Holotype, NM H4515/T3573, 30,9 × 10,8 mm: 15–16. Paratype, NM J4278/T139, Angoche, northern Mozambique; with posterior end of outer lip enlarged.

As so much confusion has attended this species, a full redescription, based on the lectotype, is here given.

Description: Shell claviform (b/l 0,37, a/l 0,45), aperture relatively large, siphonal canal relatively long for genus, almost straight; about 9,5 teleoconch whorls, suture fairly shallow; early whorls with a roundedly angular periphery, later ones shouldered; shoulder-slope moderately concave above shoulder, flattened below suture, subsutural cord absent, labrum conspicuously and sharply alate below anal sinus; left side of base concave, fasciole absent. Aperture narrowly pyriform, greatest width behind posterior third, siphonal canal moderately wide, its termination broadly and deeply notched; parietal lip concave, columella lip almost straight; callus thick, its edge slightly free on columella, parietal pad fairly thick, not constricting anal sinus, but forming (with end of labrum) a short, posteriorly directed spout that extends up penultimate whorl halfway to shoulder; outer lip relatively thin, its edge crenulate, stromboid notch deep and wide, anal sinus deeply U-shaped, posterior end of lip not forming a lobate projection in side view.

Sculptured by short, low axial ribs, crossed by thin, close-set spiral lirae, not forming a shoulder keel; a single broad, rounded varix immediately behind lip; growth-lines fine. Axial ribs suture-to-suture on 1st teleoconch whorl, thereafter evanescing at shoulder sulcus; most prominent at periphery, becoming weak above suture on penultimate whorl, on body whorl becoming obsolete at level of parietal/columella junction; ribs in profile roundedly angular, with gradually sloping sides; subequal to their intervals, slightly opisthocline; 1st whorl with 10 ribs, 12 on penultimate whorl, becoming weak and irregular on last whorl, and obsolete towards subterminal varix. Spiral lirae narrow and low, feebly developed on early whorls, where there is a weak subsutural cord (later obsolete); by penultimate whorl about 9 subequal, closely set lirae below shoulder, shoulder concavity with about 12 feeble, close spiral threads; base of body whorl with about 38 spiral lirae, more or less equal in strength (an occasional one weaker) and much wider than their intervals, lirae on rostrum declivous; intervals between lirae on base of body whorl with traces of microscopic spiral striae.

Colour yellowish-white, early teleoconch whorl with a brown tinge.

Protoconch narrowly domed, of just under 2 whorls, 1st slightly tilted, smooth except for a few obscure, oblique axial riblets at termination; breadth 0,57 mm, height 0,50 mm (b/h 1,14).

Dimensions: 23,3 × 8,6 mm.

Ptychobela opisthochetos sp. n.

(Figs 13–16)

Diagnosis: Spire moderately high (a/l 0,42–0,43), siphonal canal slightly produced, shoulder slope evenly concave, with a rather weak subsutural cord, outer lip sometimes weakly alate posteriorly, posterior angle of aperture forming a deep spout that extends up penultimate whorl to shoulder, outer lip crenulate, its posterior end forming a lobate projection in side view; sculptured by low, gently rounded axial ribs, mostly developed at periphery, 8–9 (rarely 11) on penultimate whorl; spiral lirae much narrower than their intervals, 4–8 below shoulder and

14–22 on base of body whorl, plus 5–7 feeble striae in shoulder concavity, one lira at shoulder more prominent than others; off-white, tinged between axials with light brown, or brown with pale spiral lirae, rostrum and lip; protoconch of about 1,5 whorls, breadth 0,70–0,73 mm; attains 31,7 mm length.

Description: Shell claviform (b/l 0,34–0,36, a/l 0,42–0,43), aperture relatively large, siphonal canal slightly produced, almost straight; about 9,5 teleoconch whorls, suture fairly shallow; whorls with a somewhat angular to shouldered periphery, shoulder-slope evenly concave, subsutural cord fairly weak but distinct, outer lip sometimes weakly alate below anal sinus; left side of base concave, fasciole feebly developed. Aperture narrowly pyriform, greatest width at posterior third, siphonal canal moderately wide, its termination broadly and deeply notched; labium sinuous, columella gently convex; callus thick, edge sometimes slightly free, parietal pad thick and angular, not constricting anal sinus, but forming (with end of labrum) a deep, posteriorly directed spout that extends up penultimate whorl to shoulder; outer lip relatively thin, its edge strongly crenulate, stromboid notch deep, anal sinus deeply U-shaped, posterior end of lip forming a conspicuous, lobate projection in side view.

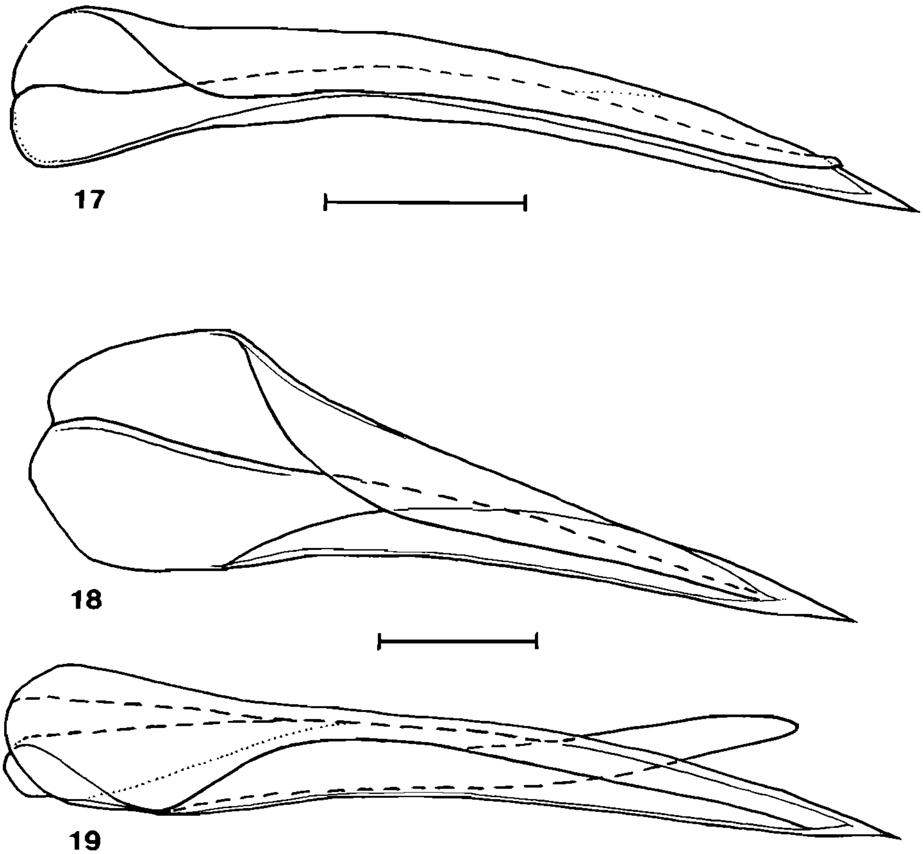
Sculptured by short axial ribs, crossed by thin, widely spaced spiral lirae, one of which forms a narrow keel at shoulder angle; a single broad, rounded varix just behind lip (sometimes as much as a fifth of a whorl back); growth-lines fairly coarse. Axial ribs most prominent at shoulder, evanescing at shoulder sulcus and becoming weak above suture, on body whorl generally obsolete at parietal level (rarely reaching base of rostrum); ribs in cross-section gently rounded, with gradually sloping sides; subequal to their intervals, slightly opisthocline; 1st whorl with 7–9 ribs, 8–9 on penultimate whorl (rarely as many as 11), becoming irregular to obsolete towards subterminal varix. Spiral lirae thin and low; 1st whorl with about 6 fine, close threads, plus a subsutural cord; by penultimate whorl 4–8 lirae below shoulder, sometimes alternately weaker and stronger, one at shoulder more prominent than the others; shoulder sulcus with 5–7 feeble, close spiral threads, subsutural cord more or less bicarinate, the posterior ridge weak; base of body whorl with 14–22 spiral lirae, plus an occasional feeble intermediary, these lirae very much narrower than their intervals and more or less equal in strength, except on rostrum where they are close-set.

Two colour forms occur: (a) Sandy substrates (Figs 13–14): yellowish-white, tinged between axials with yellowish-grey or light greyish-brown, spiral lirae pale, interior light greyish- to moderate brown; (b) muddy substrates (Figs 15–16): dark to moderate brown, spiral lirae (notably shoulder keel), rostrum and back of lip pale; surface somewhat glossy.

Protoconch narrowly domed, of about 1,5 whorls, 1st tilted, smooth except for a few, fine, close axial riblets at termination; breadth 0,70–0,73 mm, height 0,58–0,60 mm (b/h 1,17–1,26).

Dimensions: 30,9 × 10,8 mm (holotype); largest paratype 31,7 [protoconch missing] × 11,4 mm.

Operculum oblanceolate, with an acute, terminal nucleus; deep to moderate yellowish-brown.



Figs 17–19. Radula of *Ptychobela suturalis* and *P. nodulosa*. Fig. 17. *P. suturalis*: Broome, Western Australia. 18–19. *P. nodularis*, Bombay Island, India. Scale-line 0,05 mm.

Range: Mozambique littoral.

Type material: Holotype NM H4515/T3573, S. of Opopuro, Memba Bay (14°13'S, 40°38'E), northern Mozambique, soft sand, rocks, *Thalassodendron*, little surf, 4 ft above LST, K. Grosch. Paratypes: NORTHERN MOZAMBIQUE (all NM: K. Grosch, unless otherwise stated): Memba Bay, amongst rocks inside reef, 5 ft above LST (H4519/T132, one); Nacala Bay, under rock in soft sand, little surf, 3 ft above LST (H4516/T130, one) and under rock in gravelly sand, 4 ft above LST (H4520/T133, one); Conducia Bay (H4524/T137, two), under rock slab inshore, little surf, 4 ft above LST (H4521/T138, one); Mozambique Island, under rock in fine muddy sand, 5 ft above LST (H4518/T134, H4522/T131, one each); Lunga Bay, under rock in muddy gravel, 4 ft above LST (H4523/T136, one); Angoche, open muddy sandbank, little wave action (J4278/T139, three, plus one in ANSP). SOUTHERN MOZAMBIQUE: Vilanculos (NM F7263/T140: E. Ralph, one); 0,5 mi. W of Santa Carolina Island, Bazaruto Archipelago, sand and shell debris, 3 fath. at LST (NM J5791/T135: E. Roscoe, a juvenile).

Other material: Benguera Island, Bazaruto Archipelago, north channel, 10–40 ft, sand and *Thalassodendron* (NM J8816: R. K., E. Roscoe, two worn); 3 mi. S. W. of Bazaruto Island, sandbanks (NM J5792: E. Roscoe, one worn).

Notes: *Ptychobela opisthochetos* closely resembles *P. suturalis* (Gray, 1838) in form and sculpture, but differs in the conspicuous spout-like posterior angle to its aperture (Fig. 16) and in the lesser development of intermediaries between the main spiral lirae; development of a shoulder keel in *suturalis* appears to be a variable character. Another allied species is *P. sumatrensis* (Petit de la Saussaye, 1852), in which a somewhat similar anal 'spout' occurs (albeit in a much more weakly developed state); that species has a lower spire than *opisthochetos* (a/l 0,45 instead of 0,42–0,43), denser spiral sculpture and neither a shoulder keel nor a subsutural cord. *P. griffithii* similarly differs from *opisthochetos* in lacking both a subsutural cord and a distinct shoulder keel; also, it has rather granular spiral lirae (with numerous intermediaries) and the anal 'spout' is relatively weakly developed.

Etymology: *opisthen* (behind) + *ochetos* (a conduit or aqueduct), Greek.

ACKNOWLEDGEMENTS

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ABBREVIATIONS

a/l = ratio of aperture length to total shell length (measured along main axis).
ANSP = Academy of Natural Sciences of Philadelphia.
b/h = ratio of maximum protoconch breadth to its height.
b/l = ratio of maximum breadth to total length.
BM(NH) = British Museum (Natural History).
MHNG = Muséum National d'Histoire Naturelle, Geneva.
MHNP = Muséum National d'Histoire Naturelle, Paris.
NM = Natal Museum.
NSMT = National Science Museum, Tokyo.

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